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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/099,981	03/19/2002	Toshiaki Aoai	Q69083	5513

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EXAMINER

ASHTON, ROSEMARY E

ART UNIT	PAPER NUMBER
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1752

DATE MAILED: 09/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/099,981

Applicant(s)

AOAI ET AL.

Examiner

Rosemary E. Ashton

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 June 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11,13-39 and 41-43 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 17-25 and 27-30 is/are allowed.
- 6) ☒ Claim(s) 1,2,4,8-11,13-16,31,32,34-39 and 41-43 is/are rejected.
- 7) ☒ Claim(s) 3 and 33 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>3/10/02</u> | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION***Nonstatutory Double Patenting***

1. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

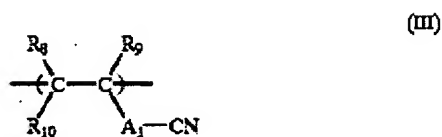
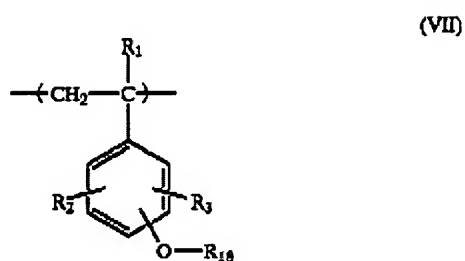
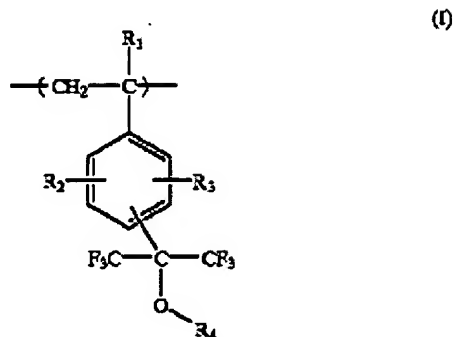
Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

2. Claims 32 and 39 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 3 of U.S. Patent No. 6,878,502. Although the conflicting claims are not identical, they are not patentably distinct from each other because they both read on a positive resist composition comprising the same polymers.

Claims 32 and 39 of the instant application read on a positive resist composition comprising a polymer containing a monomer having formula I, a monomer having formula III and a monomer having formula VII, shown below, which is a styrene monomer having a $-O-C(R)_3$ or a $C(R)_2-OR$ group on the phenyl ring.

Claims 32 and 39 read on the same polymer, but claim 39 claims specific acid generating compounds not claimed in 32 or claim 3 of the patent. These claims read on the broad limitation of a compound capable of generating an acid.

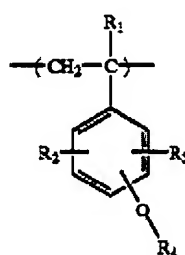
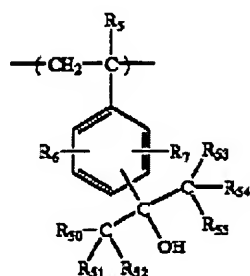
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Claim 3 of the patent reads on a positive resist composition comprising a polymer containing a monomer having formula I, a monomer having formula II, shown below and a monomer having formula 3 (see claim 1) which is defined in claim 3 as being (meth)acrylonitrile.

(Meth)acrylonitrile is the same as monomer III above when A1 is a single bond, as defined. When R2-R4 are H atoms, as defined, in formula I of the instant application and R50-R55 are F atoms, as defined, in formula I in the patent then formula I of the patent is the same as formula I of the instant application. Formula VII of the instant application is the same as formula II of the patent because R18 and R4 are defined as having the same functional groups, $-O-C(R)_3$ or a $C(R)_2-OR$.

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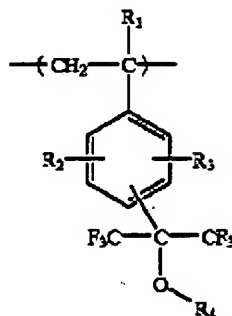
As to claim 39, the examiner finds claim 39 is an obvious double patenting over claim 3 of the patent because the claimed photoacid generators, such as oxime sulfonates and disulfones, are well known in the art, as shown in the prior art applied in the prior office actions.

3. Claim 4 is rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 3 of U.S. Patent No. 6,878,502. Although the conflicting claims are not identical, they are not patentably distinct from each other because they both read on a positive resist composition comprising the same polymers.

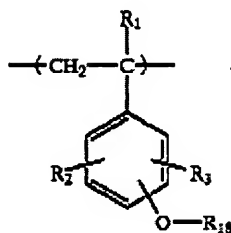
Claim 4 of the instant application read on a positive resist composition comprising a polymer containing a monomer having formula I, a monomer having formula VI and a monomer having formula VII, shown below, which is a styrene monomer having a $-O-C(R)_3$ or a $C(R)_2-OR$ $-O-C(R)_3$ group on the phenyl ring.

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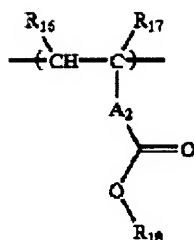
(I)



(VII)



(VI)

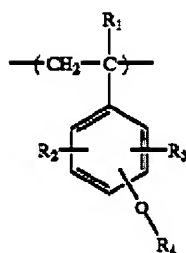
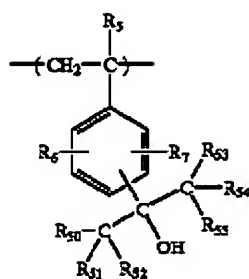


Claim 3 of the patent reads on a positive resist composition comprising a polymer containing a monomer having formula I, a monomer having formula II, shown below, and a monomer having formula 3 (see claim 1) which is defined in claim 3 as being a (meth)acrylic acid ester.

(Meth)acrylic acid ester is the same as monomer VI above when R18 is C(ak)3, as defined. When R2-R4 are H atoms, as defined, in formula I of the instant application and R50-R55 are F atoms, as defined, in formula I in the patent then formula I of the patent is the same as formula I of the instant

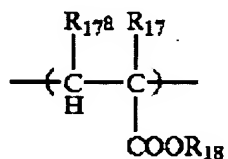
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application. Formula VII of the instant application is the same as formula II of the patent because R18 and R4 are defined as having the same functional groups, $-O-C(R)_3$ or a $C(R)_2-OR$ group.



As to claim 4, the examiner finds claim 4 is an obvious double patenting over claim 3 of the patent because the claimed surfactants, such as fluorine or silicon containing surfactants, are well known in the art, as shown in the prior art applied in the prior office actions.

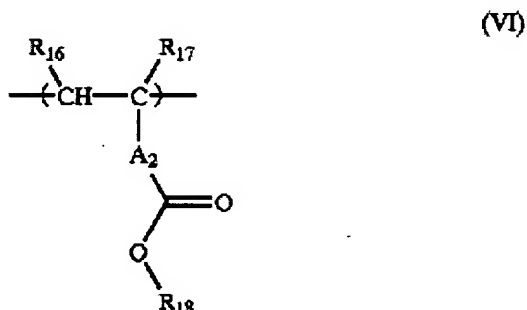
5. The ester group in the patent having formula VI, shown below, can not be used to reject the ester group in the instant application, having formula VI, shown below, because formula VI in the patent is defined as having at least one fluorine containing group which is not one of the groups for formula VI of the instant application.



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(V); R_{18} represents $-\bar{C}(R_{18d})(R_{18e})(R_{18f})$ or $-\bar{C}(R_{18d})(R_{18e})(OR_{18g})$; R_{18d} to R_{18g} , which may be the same or different, represent a hydrogen atom or, an alkyl, a cycloalkyl, an alkenyl, an aralkyl or an aryl group, each of which may have a substituent; two of R_{18d} , R_{18e} and R_{18f} or two of R_{18d} , R_{18e} and R_{18g} may connect together to form a ring; at least one of R_{18d} , R_{18e} and R_{18f} or at least one of R_{18d} , R_{18e} and R_{18g} is a fluorine-containing group:

PATENT, Formula VI



or a haloalkyl group which may be substituted; R_{18} represents $-\bar{C}(R_{19})(R_{20})(R_{21})$, $-\bar{C}(R_{19})(R_{20})(R_{22})$, or the group represented by formula (VIII) below; R_{19} to R_{22} , which are the same or different, each independently represents an alkyl group, a mono- or polycyclic cycloalkyl group, an alkenyl group, an aralkyl group or an aryl group, each of which may be substituted; two of R_{19} , R_{20} and R_{21} or two of R_{19} , R_{20} and R_{22} may combine with each other to form a ring;

APPLICATION, Formula VI

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Claim Rejections - 35 USC § 103

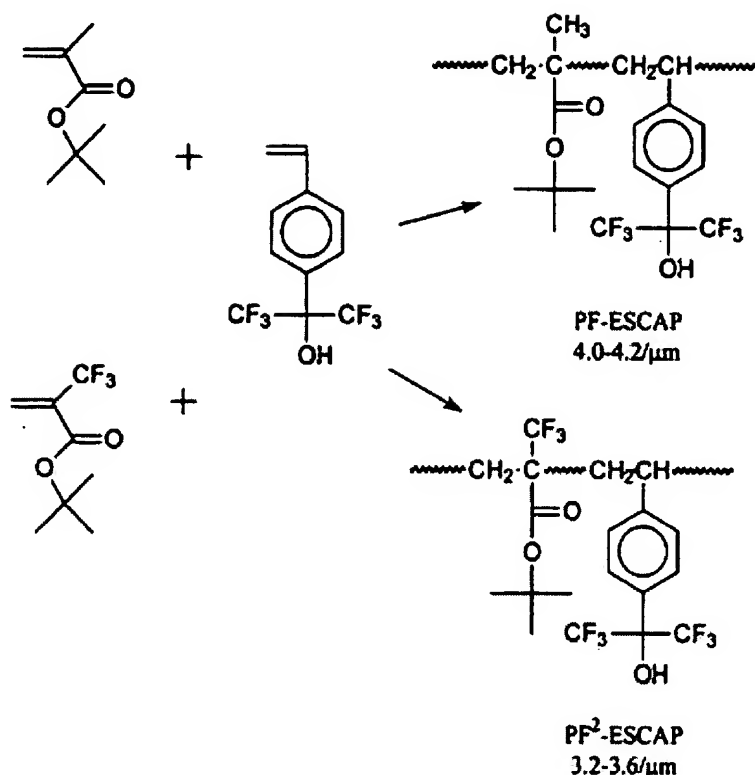
4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1,4,5,6,8,10,11,13-16 are rejected under 35 U.S.C. 103 as being unpatentable over Ito et al.(J.Vacuum Sci.Tech., 2001).

As shown in Diagram II (below), line 18 on page 7 and the second to last line on page 8, Ito teaches a positive resist composition for exposure to 157 nm comprising a resin having monomers of Formula I in claim 1 and a t-butyl methacrylate which has acid labile groups. The resin is capable of decomposing by the action of an acid because it has acid labile groups that increase the solubility in alkali developer. The photoacid generator is an iodonium compound.

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**Diagram II**

It does not teach the composition has a surfactant, however, as shown in prior art rejections, surfactants in positive resist compositions is not novel and thus it would have been obvious to one of ordinary skill in the art to use a surfactant in the positive resist composition with a reasonable expectation of obtaining a positive resist compositions having improved coatability because it is well known in the art that fluorine or silicon containing surfactants improve coating uniformity.

Use of a nitrogen compound to control acid diffusion is also well known in the art, thus, it would have been obvious to one of ordinary skill in the art to use an acid diffusion control compound in the composition with a reasonable expectation of obtaining a positive resist compositions having improved pattern resolution because it is well known in the art that a nitrogen compound acid diffusion control agent improves pattern resolution by limiting acid diffusion away from the exposure site.

As to claims 8,10 and 11 it would have been obvious to one of ordinary skill in the art to vary the amount of reagents with a reasonable expectation of obtaining a resist composition capable of being a

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positive resist because it is a standard procedure in the art to vary the amount of reagents in a resist composition to obtain the best formulation for pattern resolution and photosensitivity.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1,2,4,5,7,8-11,13-16,31,32,34,35,36,38,39,41 are rejected under 35 U.S.C. 102(e) as being anticipated by Hashimoto et al. US 2002/0155376 A1.

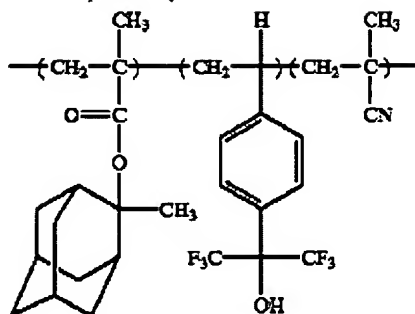
Hashimoto teaches a positive resist composition for exposure to 157 nm comprising a resin (Resin 4, sec. 146) having monomers of Formula I in claim 1, methacrylonitrile as in claim 2 and a methyl-adamantyl methacrylate as in claim 4(see below). The resin has a molecular weight of 6,900 as in claim 9. The methyl-adamantyl methacrylate has an acid labile group. The phenolic derivative monomer V in section 37 is the same as formula VII in the instant application. Acid labile groups are taught in section 20. R18 may be a t-butyl group or a 2 alkyl-2 adamantyl group which meet the formula of VIII for R18.

The patent teaches the composition has a surfactant and a nitrogen compound as in claim34 (sections 131 and 123-128).

The photoacid generator is a disulfonic compound (sec. 96) or an imide-N-sulfonate compound (sec. 119-122).

The composition is exposed to 157 nm using an F2 laser and developed (sec. 165-168).

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Section 41 teaches the resin has the monomers in claim 31 and 32. The photoacid generator (PAG) may be a disulfonic compound (sec. 96).

Claim Rejections - 35 USC § 103

8. Claims 35,42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hashimoto in view of Kim et al. patent no. 6,713,228.

In section 60 Hashimoto teaches the PAG may be diphenyliodonium trifluoromethanesulfonate (triflate) which has only one carbon atom. Claim 35 requires at least 2 carbon atoms.

In col. 12, shown below, Kim teaches the equivalency of diphenyliodonium triflate (line 1) and diphenyliodonium nonflate (line 6) which is nonafluorobutanesulfonate having 4 carbon atoms in the perfluoroalkylsulfonate ester.

antimonate, diphenyliodonium triflate, diphenyliodonium
antimonate, methoxydiphenyliodonium triflate, di-
butyldiphenyliodonium triflate, 2,6-dinitrobenzyl
sulfonates, pyrogallol tris(alkylsulfonates),
50 N-hydroxysuccinimide triflate, norbornene-dicarboximide-
triflate, triphenylsulfonium nonaflate, diphenyliodonium
nonaflate, methoxydiphenyliodonium nonaflate, di-t-

It would have been obvious to one of ordinary skill in the art to use diphenyliodonium nonflate as the PAG, rather than diphenyliodonium triflate, in the invention of Hashimoto with a reasonable

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expectation of obtaining a positive resist composition patternable at 157 nm because Kim teaches the two compounds are equivalent in the art of exposing resist compositions at 157 nm (col. 13, lines 26-32).

9. Claims 37,43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hashimoto in view of Kawabe et al. patent no. 6,159,656.

As shown above Hashimoto teaches the resist composition may comprise a surfactant, however, it does not teach the type of surfactant.

Surfactants having fluorine atoms or silicon atoms are well known in the art as shown in the teaching of Kawabe et al.

Kawabe teaches a positive resist composition comprising a resin having acid labile groups, a PAG, a nitrogen containing basic compound and a surfactants having either a fluorine atom or a silicon atom (abstract).

It would have been obvious to one of ordinary skill in the art to use a surfactant having fluorine or silicon atoms in the invention of Hashimoto with a reasonable expectation of obtaining a resist composition for exposure at 157 nm because surfactants having fluorine atoms or silicon atoms are well know in the art to improve coatability of the resist.

Allowable Subject Matter

10. Claims 3,33 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

11. The following is a statement of reasons for the indication of allowable subject matter: The prior art does not teach a positive resist comprising a polymer having formula I and maleic anhydride or formula I and N-substituted maleimide.

12. Claims 17-25,27-30 are allowed.

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13. The following is an examiner's statement of reasons for allowance: The prior art fails to disclose or suggest positive resist comprising a polymer having formula I and maleic anhydride or formula I and N-substituted maleimide.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rosemary E. Ashton whose telephone number is 571-272-1326. The examiner can normally be reached on Mon-Fri, 11:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia Kelly can be reached on 571-272-1526. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Rosemary E. Ashton
Primary Examiner
Art Unit 1752

September 9, 2005

ROSEMARY ASHTON
PRIMARY EXAMINER

IPS

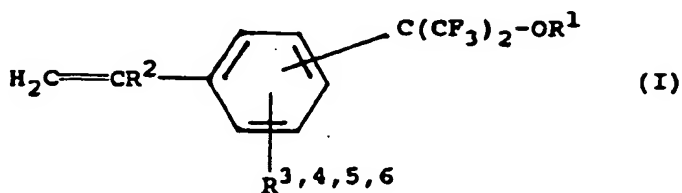
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Aoi et al.

Concise Explanation

Translation

DE 4207261 A1 discloses a photoresist composition comprising a resin as follows:

NO.



R¹: acid-decomposable group.

R Ashita

9/18/05